

1. (cancelled)
2. (cancelled)
3. (cancelled)
4. (cancelled)
5. (original) A method for making a polymeric, phosphorus-containing composition by heating, in the presence of an initiator, and, optionally in the presence of a Group VIII transition metal, a composition comprising at least one compound of Formula I and/or at least one compound of Formula II,

 $y = 0 \text{ to } 2;$

a and b are individually either 0, 1, or 2, provided $a+b = 2$;

each Ar is individually selected from the group consisting of phenyl, substituted phenyl, naphthyl, and substituted naphthyl, provided that the two Ar groups that are directly or indirectly bonded to the same phosphorus atom may be linked to each other by a linking unit selected from the group consisting of direct bond, alkylidene, secondary or tertiary amine, oxygen, sulfide, sulfone, and sulfoxide;

each Ar can be further substituted with C₁ to C₂₀ branched or straight chain alkyl, C₁ to C₂₀ cycloalkyl, C₆ to C₂₀ aryl, acetal, ketal, alkoxy, cycloalkoxy,

aryloxy, formyl, ester, fluorine, chlorine, bromine, perhaloalkyl, hydrocarbylsulfinyl, hydrocarbylsulfonyl, hydrocarbylcarbonyl or cyclic ether;

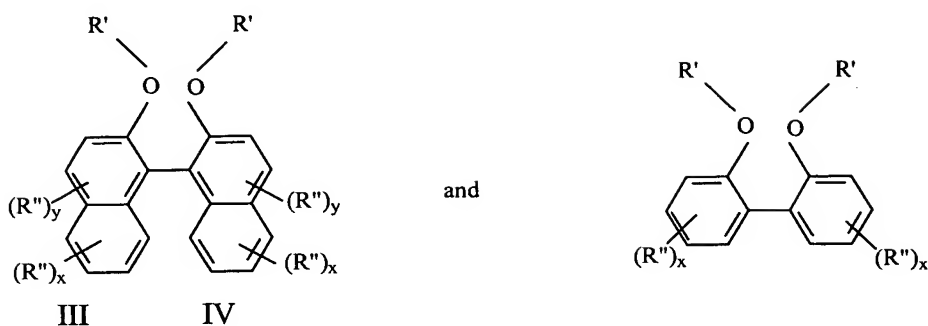
each R is individually selected from the group consisting of hydrogen, ethenyl, propenyl, acryloyl, methacryloyl and an organic radical with a terminal ethenyl, propenyl, acryloyl, or methacryloyl group;

each R" is individually selected from the group consisting of hydrogen, linear or branched alkyl, cycloalkyl, acetal, ketal, aryl, alkoxy, cycloalkoxy, aryloxy, formyl, ester, fluorine, chlorine, bromine, perhaloalkyl, hydrocarbylsulfinyl, hydrocarbylsulfonyl, hydrocarbylcarbonyl, cyclic ether, ethenyl, propenyl, and an organic radical with a terminal ethenyl or propenyl group;

provided at least one R represents ethenyl, propenyl, acryloyl, methacryloyl or the organic radical with a terminal ethenyl, propenyl, acryloyl, or methacryloyl group or at least one R" represents ethenyl, propenyl, or the organic radical with a terminal ethenyl or propenyl group,

at atmospheric pressure and a temperature between 20°C and 150°C for 1 to 100 hours to produce the polymeric composition.

6. (cancelled)
7. (original) The method of claim 5 wherein the initiator is a free radical initiator.
8. (original) A polymeric, phosphorus-containing composition made by the process of Claim 5.
9. (cancelled)
10. (cancelled)
12. (cancelled)
13. (original) A process for making a polymeric, phosphorus-containing composition by:
 - (1) heating, in the presence of an initiator, a composition comprising at least one compound of Formula III and/or at least one compound of Formula IV:



wherein:

x = 0 to 4;

y = 0 to 2;

each R' is individually selected from the group consisting of hydrogen or an alkali metal or an alkaline earth metal or a hydroxyl protective group selected from the group consisting of alkyl, alkoxyalkyl, carbonylalkyl, and a crown ether formed by taking both R' groups together;

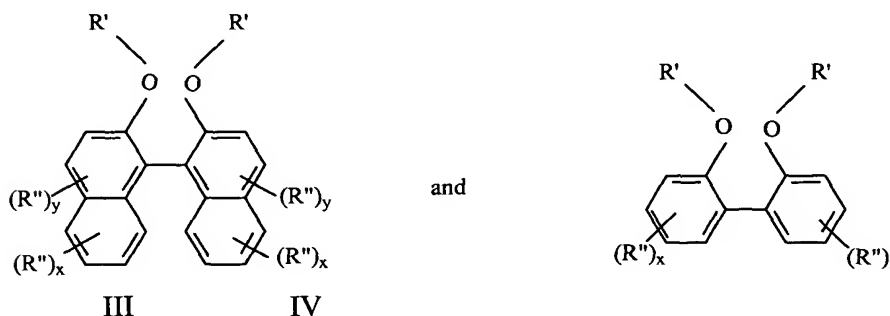
each R'' is individually selected from the group consisting of hydrogen, linear or branched alkyl, cycloalkyl, acetal, ketal, aryl, alkoxy, cycloalkoxy, aryloxy, formyl, ester, fluorine, chlorine, bromine, perhaloalkyl, hydrocarbylsulfinyl, hydrocarbylsulfonyl, hydrocarboylcarbonyl, cyclic ether, ethenyl, propenyl, and an organic radical with a terminal ethenyl or propenyl group; provided at least one R'' is ethenyl, propenyl, or the organic radical with a terminal ethenyl or propenyl group and

(2) if R' is a hydroxyl protective group, converting R' to H or an alkali metal or alkaline earth metal and,

(3) phosphonylating the product of step (1) if R' is other than a hydroxyl protective group, or the product of steps (1) and (2) if R' is a hydroxyl protective group, with trivalent phosphorus of a diaryloxyphosphite unit, $-P(-O-Ar)_2$, a diarylphosphine unit, $-P(Ar)_2$, or an aryl, aryloxyphosphinite unit, $-P(Ar)(-O-Ar)$, or mixture thereof, where each Ar is individually selected from the group consisting of phenyl, substituted phenyl, naphthyl, and substituted naphthyl, provided that the two Ar groups that are directly or indirectly bonded to the same phosphorus atom may be linked to each other by a linking unit selected from the

group consisting of direct bond, alkylidene, secondary or tertiary amine, oxygen, sulfide, sulfone, and sulfoxide.

14. (cancelled)
15. (original) The method of claim 13 wherein the initiator is a free radical initiator.
16. (original) A polymeric composition made by the method of Claim 13.
17. (original) A method to produce a polymeric, phosphorus-containing composition by heating a phosphorochloridite containing at least one acrylate or methyl acrylate group in the presence of an initiator to produce a polymer containing phosphorochloridite, and further reacting this polymer with a composition comprising at least one compound of Formula III and/or Formula IV:



wherein:

x = 0 to 4;

y = 0 to 2;

each R' is individually selected from the group consisting of hydrogen or an alkali metal or an alkaline earth metal or a hydroxyl protective group selected from the group consisting of alkyl, alkoxyalkyl, carbonylalkyl, and a crown ether formed by taking both R' groups together, with the provision that if R' is protected, the protecting group must be removed before reacting the compound of Formula III and/or Formula IV with the polymer containing phosphorochloridite;

each R'' is individually selected from the group consisting of hydrogen, linear or branched alkyl, cycloalkyl, acetal, ketal, aryl, alkoxy, cycloalkoxy, aryloxy, formyl, ester, fluorine, chlorine, bromine, perhaloalkyl, hydrocarbylsulfinyl, hydrocarbylsulfonyl, hydrocarboylcarbonyl, cyclic ether, ethenyl, propenyl, and an organic radical with a terminal ethenyl or propenyl

group; provided at least one R" is ethenyl, propenyl, or the organic radical with a terminal ethenyl or propenyl group.

18. (cancelled)
19. (original) The method of Claim 17 where the initiator is a free radical initiator.
20. (original) A polymeric composition made by the method of Claim 17.
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